

Efficient Composite Repair Methods for Launch Vehicles, Phase I

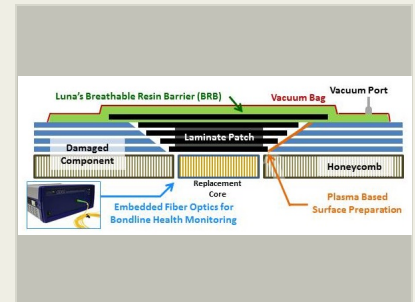
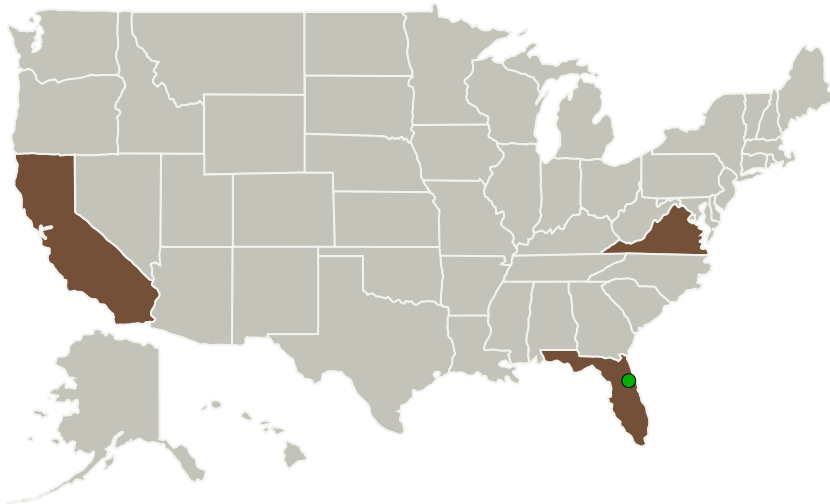
Completed Technology Project (2017 - 2018)



Project Introduction

Polymer matrix composites are increasingly replacing traditional metallic materials in NASA launch vehicles. However, the repair and subsequent inspection methods for these materials are considerably more complicated. Typically, a composite laminate patch must be manually fabricated and bonded or co-cured to the damaged structure. To ensure high quality patches with sufficient compaction and low void content, significant time, preparation and equipment is required. Current surface preparations require time consuming labor and can be a risk for further damage. The ideal repair methodology would allow for a rapid structural repair to be performed on-site in locations with minimal access and without the need for extensive tooling, surface prep, cure times and complicated inspection techniques. Engineers at Luna have developed a number of technologies that have the potential to enable high performance composite repair and inspection during pre-launch ground processing. Luna's comprehensive system will realize improvements via facile surface preparation, reduction of specialized fabrication equipment, rapid-on-demand curing resins and utilization of Luna's unique fiber optic measurement capability for monitoring repair state. This Phase I program will focus on developing these methods for composite damage that can be performed during ground processing of the launch vehicle without the need for full replacement

Primary U.S. Work Locations and Key Partners



Efficient Composite Repair Methods for Launch Vehicles, Phase I Briefing Chart Image

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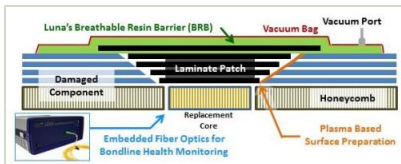
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Organizations Performing Work	Role	Type	Location
Luna Innovations, Inc.	Lead Organization	Industry	Roanoke, Virginia
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
The Aerospace Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California	Florida
Virginia	

Images



Briefing Chart Image

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Briefing Chart Image
(<https://techport.nasa.gov/image/128731>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Luna Innovations, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

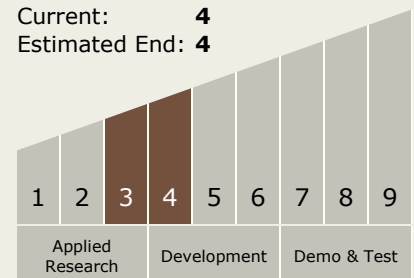
Carlos Torrez

Principal Investigator:

Daniel Metrey

Technology Maturity (TRL)

Start: 3
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.1 Lightweight Structural Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System